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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.       | CONFIRMATION NO.       |
|---|-------------|----------------------|---------------------------|------------------------|
| 10/090,735  | 03/06/2002  | David G. Figueroa    | 219.40776X00              | 5260                   |
| 7590 05/17/2007   |             |                      |                           |                        |
| c/o Anne Richards<br>Schwegman, Lundberg, Woessner & Kluth P.A.<br>1600 TCF Tower<br>121 S. 8th Street<br>Minneapolis, MN 55402 |             |                      |                           |                        |
|   |             |                      | EXAMINER<br>CRANE, SARA W |                        |
|   |             |                      | ART UNIT<br>2811          | PAPER NUMBER           |
|   |             |                      | MAIL DATE<br>05/17/2007   | DELIVERY MODE<br>PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                               |                                 |  |
|------------------------------|-------------------------------|---------------------------------|--|
| <b>Office Action Summary</b> | Application No.<br>10/090,735 | Applicant(s)<br>FIGUEROA ET AL. |  |
|                              | Examiner<br>Sara W. Crane     | Art Unit<br>2811                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2007.  
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 8-10, 26 and 27 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1-3, 8-10, 26-27 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☐ All b) ☐ Some \* c) ☐ None of:  
 1. ☐ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                 | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                        | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date. _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1-3, 8-10, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsukada et al. in view of Bhatt et al. and Sweitzer.

See reasons of record in the Office action of 1/4/2007. As noted there, with respect to claims 1 and 8, Tsukada et al. teaches a multilayer printed circuit board, with dielectric core and lamination layers as recited. With respect to the newly-added limitations, each of Bhatt et al. and Sweitzer teaches to mount a die having a plurality of terminals on an underlying printed circuit board. See 1 in the cover figure of Bhatt et al., or 10 in the cover figure of Sweitzer. Bhatt et al. teaches that ball grid array connectors at the top of a multilayer printed circuit board are desirable, for example to accommodate a high density of connectors (column 1, lines 15-20, lines 53-58). It would have been obvious to mount a die on the upper surface of the Tsukada printed circuit board, in order to implement an electrical circuit which utilizes integrated circuit chips, and it would have been obvious to provide ball grid array connectors between the die and the circuit board, in order to accommodate the I/O necessary for the chip to function. As noted previously, Tsukada figure 11 shows a single conductive layer 46 at the lower surface of the circuit board. It would have been obvious to provide solder balls, and their associated lands, at this bottom surface, as shown in the cover figure of

Bhatt et al., in order to provide electrical connection to an underlying, or "receiving" substrate.

With respect to newly-added claims 26 and 27, it would have been obvious to mount circuitry on a mother board, because the mother board carries the rest of the circuitry needed for a complete system such as a computer. An interposer would also have been obvious to provide additional circuitry connections, not already provided in the multilayer board itself.

### ***Conclusion***

Applicant notes with respect to the rejected claims that each of the elements now recited is not taught by the Tsukada reference. The two secondary references noted above are cited to show specific connections for the top and bottom layers of a multilayer circuit board, but some sort of connection must be implied by the Tsukada teaching alone, i.e., circuit connections must be made at both the top and the bottom of the Tsukada board, because otherwise the board would not serve as interlayer wiring, as desired. The use of solder balls, or ball grid array, connections, are quite common in the art, with advantages noted in each of the secondary references, and in particular in Bhatt et al.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


Art Unit: 2811

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Crane, whose telephone number is (571) 272-1652.

The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sara W. Crane  
Primary Examiner  
Art Unit 2811